CLINICAL SUMMARY

PRICO: A feasibility study in preterm infants

Summary of an article by Dijkman et al.[1]

Objectives

Optimized oxygen delivery to preterm neonates helps avoid the adverse effects of either excessive or insufficient oxygen delivery.[2-4] Systems have been developed to automatically control oxygen delivery to maintain SpO_2 within a predefined target range. This study evaluated the feasibility of closed-loop FiO_2 control by Predictive Intelligent Control of Oxygenation (PRICO) on the ZOLL® fabian® ventilator to maintain SpO_2 within a target range in preterm infants on different modes of invasive and noninvasive respiratory support.

Study methods

In two neonatal intensive care units, preterm infants with an FiO_2 >0.21 were recruited and underwent an 8-hour nonblinded treatment period of closed-loop FiO_2 control by PRICO, flanked by two 8-hour control periods of routine manual control (RMC1 and RMC2). The target range of SpO_2 was (88/89 to 95%).

Results

Thirty-two neonatal patients were enrolled (mean GA: 26+5 weeks; birth weight: 828 grams). Of the patients receiving noninvasive respiratory support, there were 18 patients on CPAP, four patients on DuoPAP, and four patients on nasal IMV. Six patients were on invasive ventilation. The median time spent within the target SpO_2 was 74.4% with PRICO, compared to 65.8% in RMC1 (p=0.011) and 60.6% in RMC2 (p<0.001). Time in severe hypoxia was lower in the PRICO period than in RMC2.

This study investigated the efficacy of PRICO in patients maintained on different modes of invasive and noninvasive respiratory support. The authors have provided real-world evidence of the usefulness of PRICO by enrolling patients who met inclusion criteria from two different tertiary care systems in the Netherlands. During the PRICO phase of the study, there was a significant increase in the time spent in the SpO_2 target range compared to the two manual control phases.

Key Takeaways

- Dijkman et al. showed in 32 preterm infants that PRICO improved time spent within the SpO_2 target range as compared to manual control of FiO_2.
- In this study PRICO reduced hypoxemic events compared to manual control of FiO_2.
- The study was conducted using different modes of invasive and non-invasive ventilation.
- PRICO is feasible and superior to RMC in terms of SpO_2 maintenance within SpO_2 target ranges.

Limitations

This feasibility study evaluated the performance of PRICO during an 8-hour period and reflects only a brief period of the overall time spent on oxygen and respiratory support. The study by Dijkman et al. was not designed to investigate clinical outcomes or the reduction of workload.

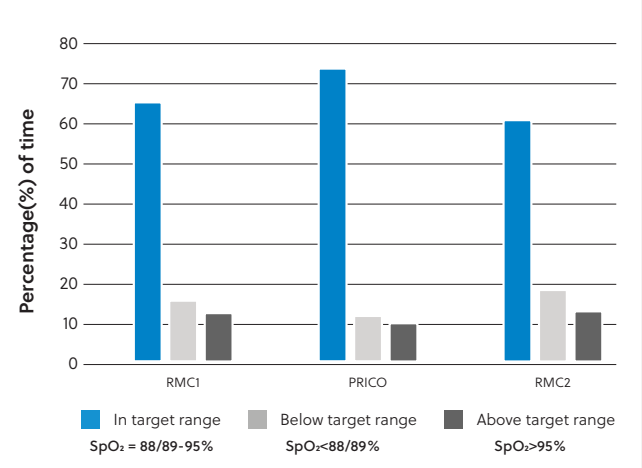

Figure 1. Percentage of time spent in target range, below target, and above target SpO_2 range.

[1]Dijkman KP, et al. Neonatology. 2023;120:2:235–241. doi: 10.1159/000527539
[2]Askie LM, et al. JAMA. 2018 June 05;319:21:2190–201. doi: 10.1001/jama.2018.5725
[3]Askie LM, et al. Cochrane Database Syst Rev. 2017 Apr 11;4:4:CD011190. doi: 10.1002/14651858.CD011190.pub2
[4]Poets CF, et al. JAMA. 2015 Aug 11;314:6:595-603. doi: 10.1001/jama.2015.8841